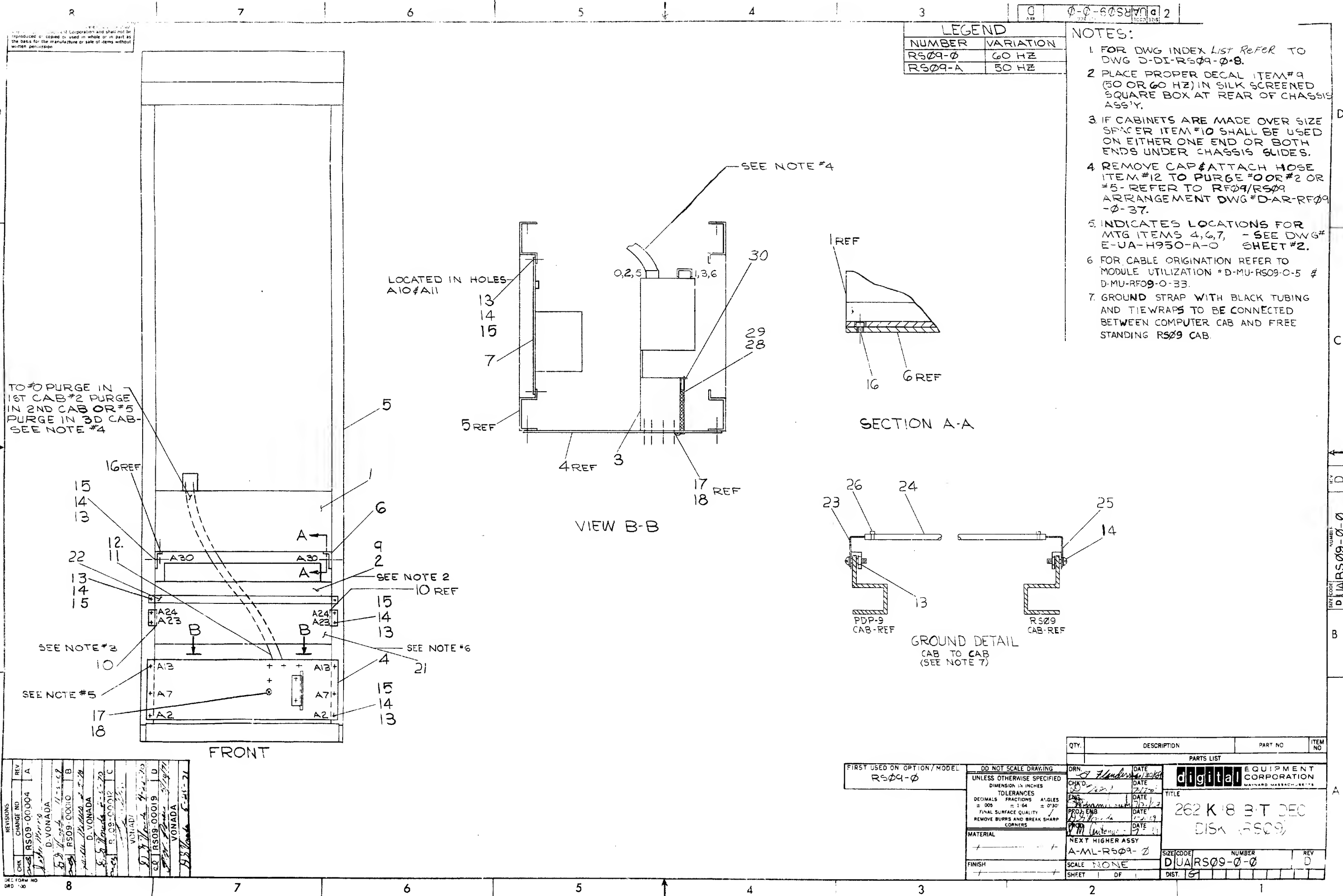


MASTER DRAWING LIST

[illegible]

MASTER DRAWING LIST

DWG. NO.		REV. LET.	NO. OF SHEETS	TITLE
D-UA-RS09-A-0		A	1	262 K 18 BIT DEC DISK
A-PL-RS09-A-0		A	2	262 K 18 BIT DEC DISK PL
D-DI-RS09-0-8		E	2	DWG INDEX LIST RS09-0
A-ML-RS09-P-0		REF	1	CHASSIS ASSY WITH LOGIC
A-ML-RS08-MA-0		REF	1	DISK ASSY 50 HZ
D-BS-RS09-0-1		A	1	CONTROL 1
D-BS-RS09-0-2			1	TRACK SELECT MATRIX 0
D-BS-RS09-0-3			1	TRACK SELECT MATRIX 1
D-BS-RS09-0-4		A	1	CONTROL UNIT CONNECTORS
D-BS-RS09-0-5		A	1	CONTROL 2
K-WL-RS09-0-WL		C		WIRE LIST
D-MU-RS09-0- 9		A	1	MODULE UTILIZATION
A-PL-RS09-0- 9		A	1	MODULE UTILIZATION LIST
D-IC-RS09-0-7				LOC CHART-TRACK HEAD CABLE
D-IC-REF09-0-35		REF	3	POWER WIRING AC/DC
D-AR-REF09-0-37		REF	1	REF09/RS09 ARRANGEMENT
A-WL-RS09-0-10			4	HAND WRAP WIRE LIST
C-WD-RS09-0-11		A	1	HAND WRAP ROUTING
A-SP-RS09-0-12			11	RS09 CALIBRATION PROCEDURE

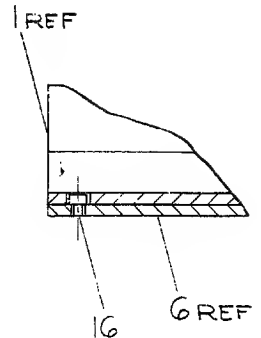


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TO #0 PURGE IN 1ST CAB #2 PURGE IN 2ND CAB OR #5 PURGE IN 3D CAB - SEE NOTE #4

LOCATED IN HOLES A10 & A11

SEE NOTE #4



SECTION A-A

VIEW B-B

SEE NOTE 2
10 REF

SEE NOTE #6
21

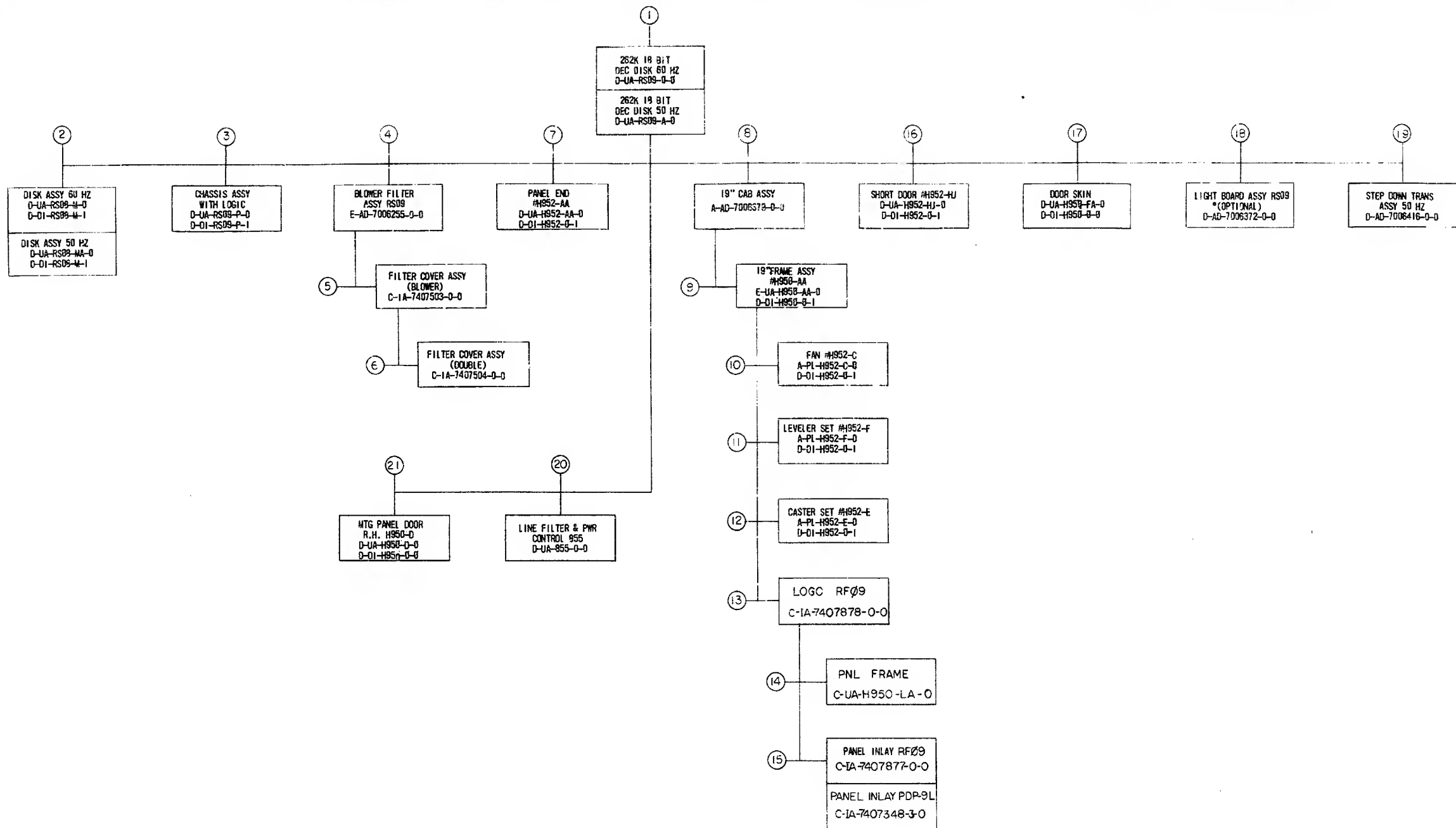
SEE NOTE #3
10

SEE NOTE #5
17

REV	CHANGE NO	DATE	BY	CHKD
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B	2	11-1-68	D. VONADA	
C	3	11-1-68	D. VONADA	
D	4	11-1-68	D. VONADA	
E	5	11-1-68	D. VONADA	
F	6	11-1-68	D. VONADA	
G	7	11-1-68	D. VONADA	
H	8	11-1-68	D. VONADA	
I	9	11-1-68	D. VONADA	
J	10	11-1-68	D. VONADA	
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L	12	11-1-68	D. VONADA	
M	13	11-1-68	D. VONADA	
N	14	11-1-68	D. VONADA	
O	15	11-1-68	D. VONADA	
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Y	25	11-1-68	D. VONADA	
Z	26	11-1-68	D. VONADA	
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AB	28	11-1-68	D. VONADA	
AC	29	11-1-68	D. VONADA	
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BW	75	11-1-68	D. VONADA	
BX	76	11-1-68	D. VONADA	
BY	77	11-1-68	D. VONADA	
BZ	78	11-1-68	D. VONADA	
CA	79	11-1-68	D. VONADA	
CB	80	11-1-68	D. VONADA	
CC	81	11-1-68	D. VONADA	
CD	82	11-1-68	D. VONADA	
CE	83	11-1-68	D. VONADA	
CF	84	11-1-68	D. VONADA	
CG	85	11-1-68	D. VONADA	
CH	86	11-1-68	D. VONADA	
CI	87	11-1-68	D. VONADA	
CJ	88	11-1-68	D. VONADA	
CK	89	11-1-68	D. VONADA	
CL	90	11-1-68	D. VONADA	
CM	91	11-1-68	D. VONADA	
CN	92	11-1-68	D. VONADA	
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CT	98	11-1-68	D. VONADA	
CU	99	11-1-68	D. VONADA	
CV	100	11-1-68	D. VONADA	

FIRST USED ON OPTION/MODEL RS09-0		DO NOT SCALE DRAWING UNLESS OTHERWISE SPECIFIED DIMENSION IN INCHES TOLERANCES DECIMALS FRACTIONS ANGLES ± .005 ± .005 ± .005 FINAL SURFACE QUALITY REMOVE BURRS AND BREAK SHARP CORNERS		DATE 3/1/68 CHK'D 3/1/68 DATE 3/1/68 ENG 3/1/68 DATE 3/1/68 PROJ ENG 3/1/68 DATE 3/1/68 PROJ 3/1/68 DATE 3/1/68		TITLE 262 K 18 B T DEC DISK (RS09)		PARTS LIST digital EQUIPMENT CORPORATION MAYNARD, MASSACHUSETTS	
MATERIAL + + + + +		NEXT HIGHER ASSY A-ML-RS09-0		SCALE NONE		SIZE CODE DUARS09-0-0		NUMBER REV D	
FINISH + + + + +		SHEET DF		DIST. 5		REV D		REV D	

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* NOT A PRODUCTION PART - USED FOR TEST PURPOSES ONLY.

REV	CHANGE NO	REV
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B	RS09-00008	B
C	RS09-00014	C
D	RS09-00019	D
E	RS09-00022	E
F	RS09-00025	F
G	RS09-00028	G
H	RS09-00031	H
I	RS09-00034	I
J	RS09-00037	J
K	RS09-00040	K
L	RS09-00043	L
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N	RS09-00049	N
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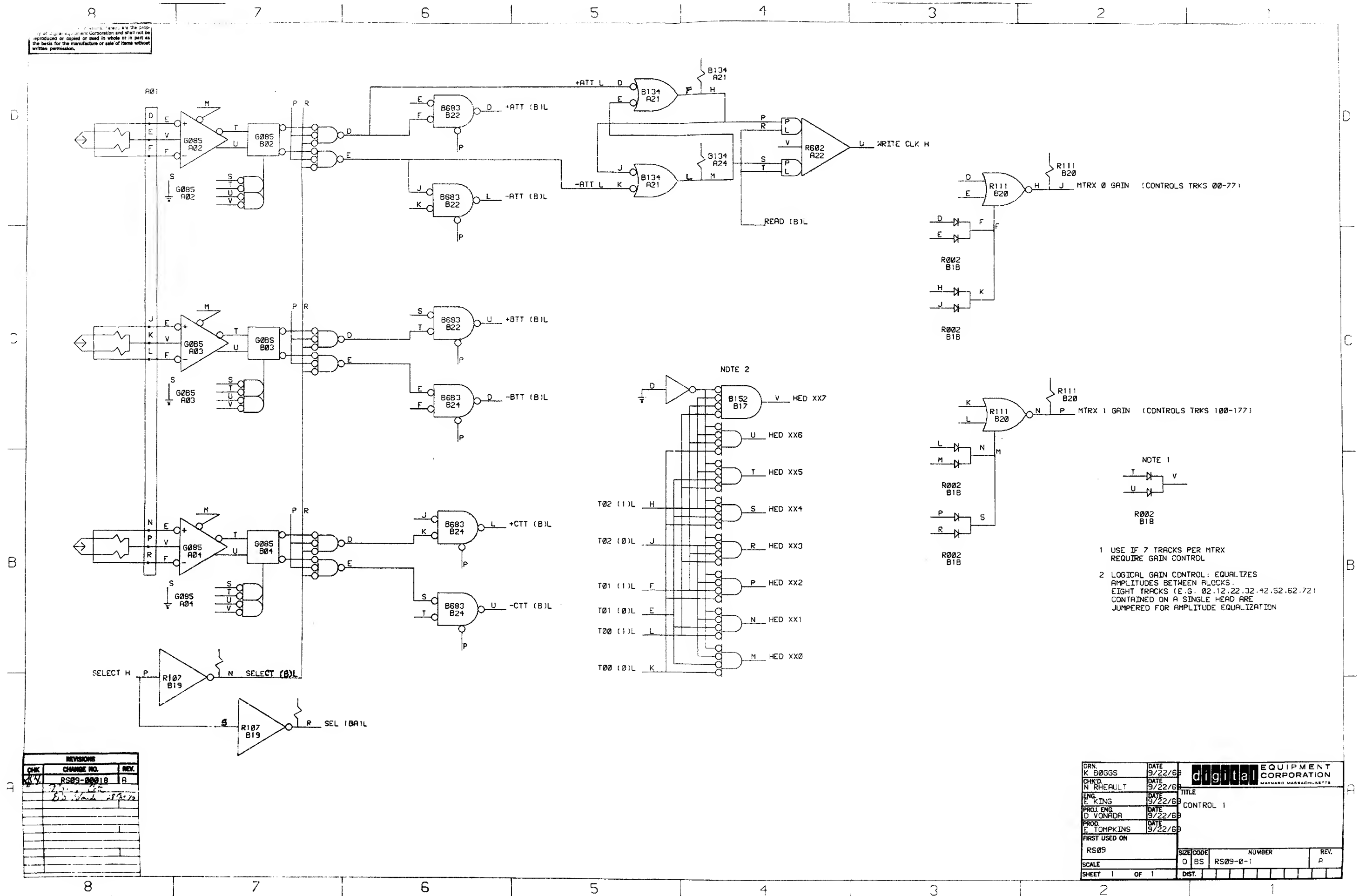
DEC FORM NO
DRC 100

FIRST USED ON OPTION/MODEL
RS09-0

DO NOT SCALE DRAWING
UNLESS OTHERWISE SPECIFIED
DIMENSION IN INCHES
TOLERANCES
DECIMALS FRACTIONS ANGLES
= .005 = 1/64 = 0°30'
FINAL SURFACE QUALITY
REMOVE BURRS AND BREAK SHARP
CORNERS
MATERIAL
FINISH

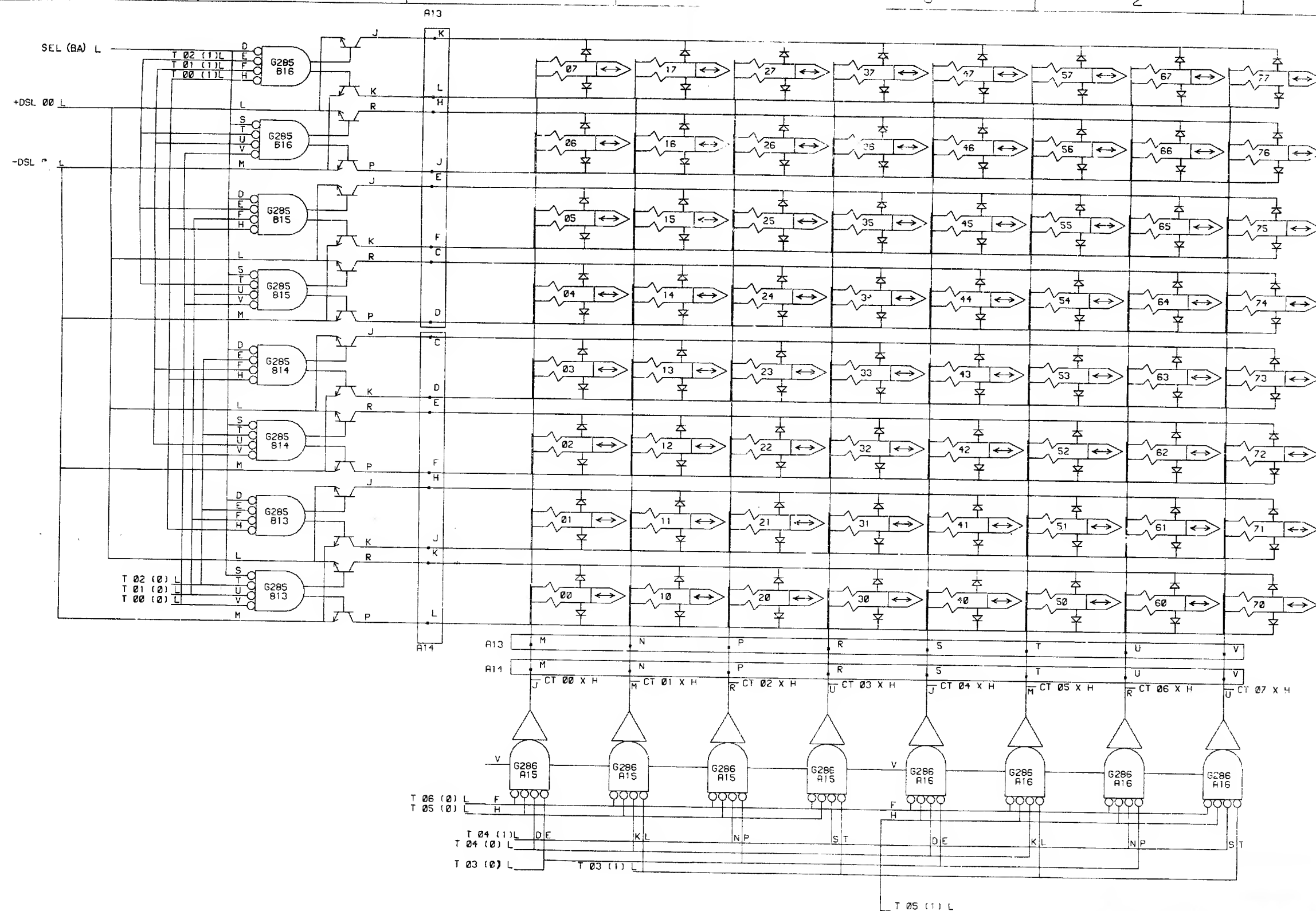
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PRD	DATE	NEXT HIGHER ASSY	
A-ML-RS09-0-		SIZE/CODE	
SCALE		NUMBER	
SHEET 1 OF 2		REV	
DIST.		E	

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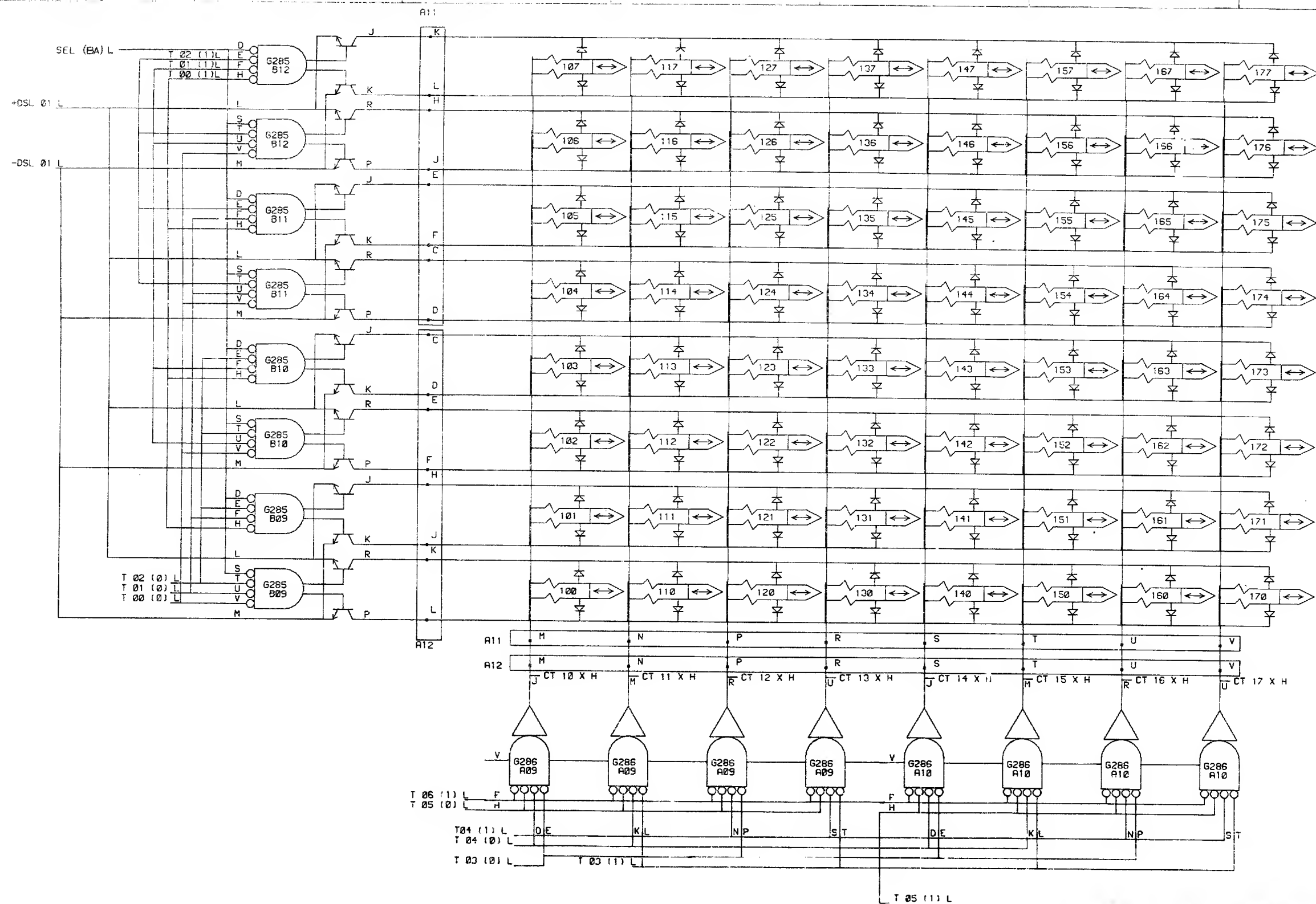
CHK	CHANGE NO.	REV.
✓	RS09-0018	A
	7/2/69	
	Ed. Smith	

DRN K 00GGS	DATE 9/22/69	<div>digital EQUIPMENT CORPORATION</div> <div>WAYNARD MASSACHUSETTS</div>																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
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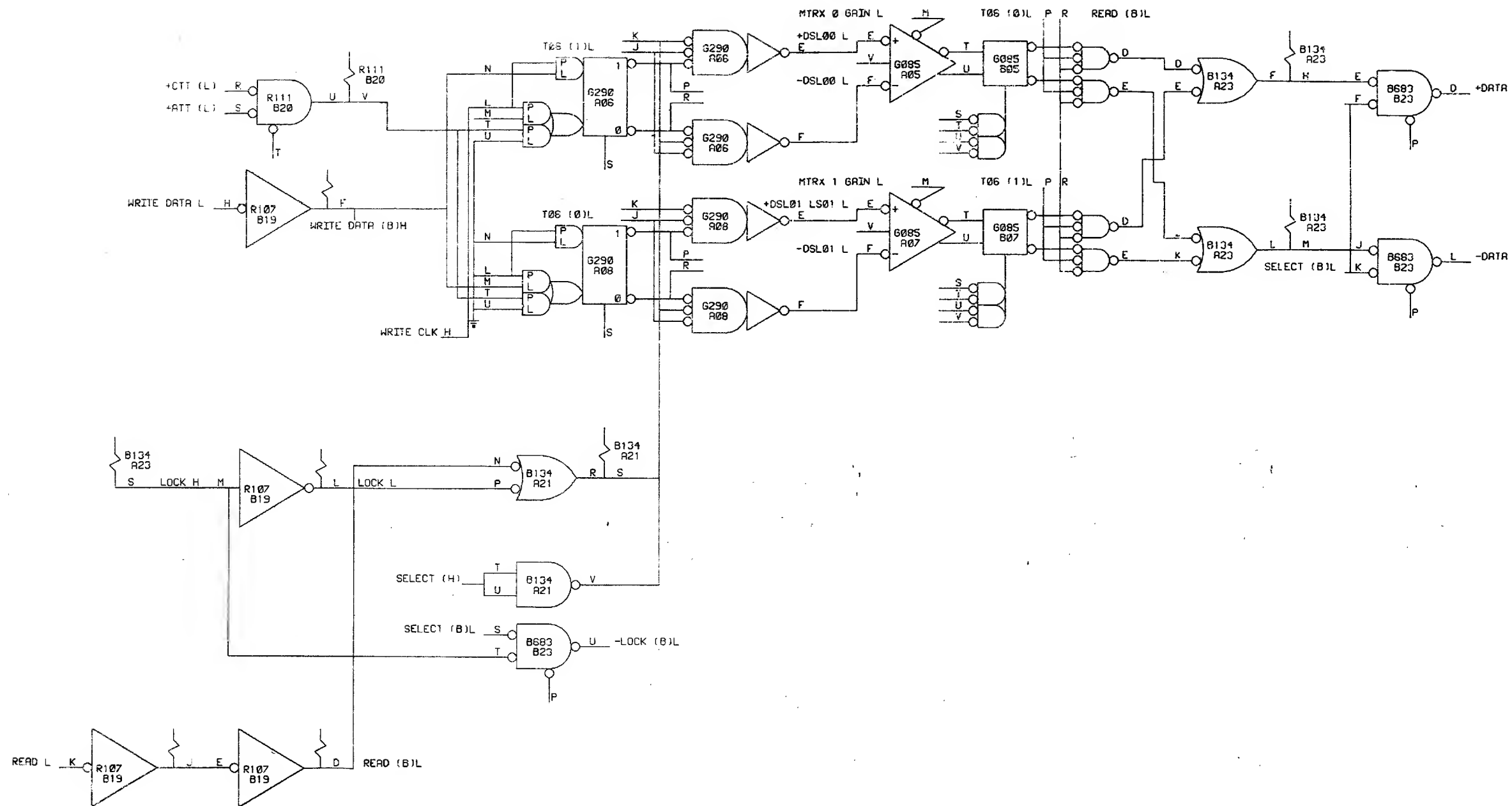
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REVISIONS		
CHK	CHANGE NO.	REV.

DATE 7-26-69 BY J. J. J. CHECKED BY J. J. J. APPROVED BY J. J. J. FIRST USED ON		digital EQUIPMENT CORPORATION TITLE TRACK SELECT MATRIX 1	
RS09 SCALE SHEET 1 OF 1	D 85 RS09-0 5 CHIT.	NUMBER 5	REV. 0

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CHK	CHANGE NO.	REV.
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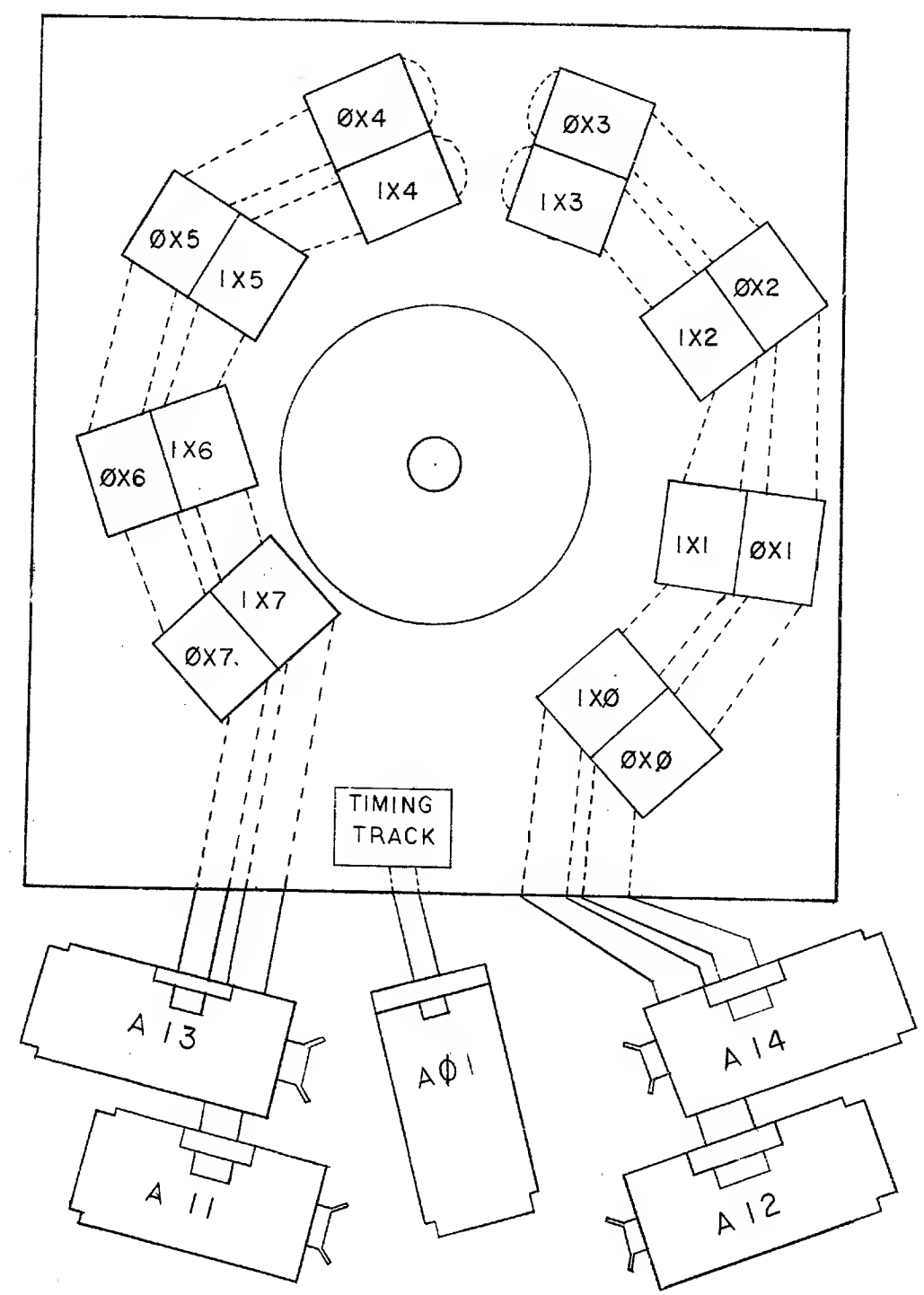
DRN	K. BOGGS	DATE	9/22/69	EQUIPMENT CORPORATION MAYNARD, MASSACHUSETTS
CHK'D	M. R. BAULT	DATE	9/22/69	
ENG	D. KING	DATE	9/22/69	
PROJ. ENG.	D. G. VONADA	DATE	9/22/69	
PROD.	C. B. JENKINS	DATE	9/22/69	
FIRST USED ON				
RS09		SIZE CODE	NUMBER	REV.
SCALE	D BS	RS09-0-5		A
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DRWG NO	REV LTR
K-WL-RS09-0-WL	C

REVISIONS			
REV LTR	ECO NO	DATE	ENG
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B	00009	1-16-70	287
C	RS09-00013	5-11-70	287

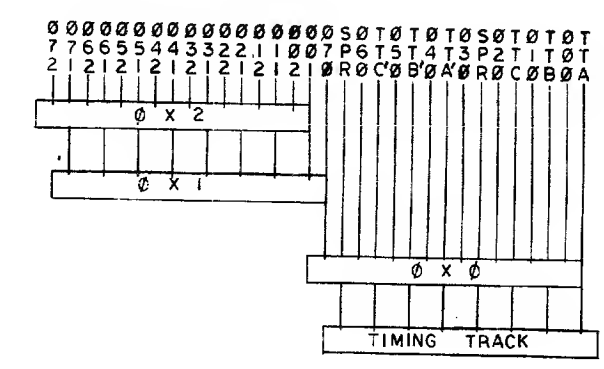
FIRST USED ON OPTION/MODEL RS09	DRAWN <i>Ed Flanigan</i>	DATE 11/21/69	 EQUIPMENT CORPORATION MAYNARD, MASSACHUSETTS	TITLE WIRE LIST			
	CHECKED <i>H. Wachman</i>	DATE 9/5/69		FOR TAPE # FILE #			
	ENG <i>C. King</i>	DATE 9-22-69		SIZE CODE DWG. NO. REV LTR			
	PROJ. ENGR <i>D. J. Horada</i>	DATE 9-22-69		K WL RS09-0-WL C			
	PROD <i>Ed Flanigan</i>	DATE 9-22-69		ASSY NO A-ML-RS09-0			
SCALE			SHEET 1 OF 1		DIST.		

TOP VIEW
DISK REMOVED



TRACK INTERLACE SCHEME

HEAD	INTERLACES	HEAD
T. TRACK		Ø x Ø
Ø x 1		Ø x 2
Ø x 3		Ø x 4
Ø x 5		Ø x 6
Ø x 7		1 x Ø
1 x 1		1 x 2
1 x 3		1 x 4
1 x 5		1 x 6
1 x 7		




OUTER EDGE
ROTATION AS SHOWN

REV.	CHANGE NO.
1	1

FIRST USED ON OPTION/MODEL RSØ9-Ø		QTY.	DESCRIPTION	PART NO.	ITEM NO.
UNLESS OTHERWISE SPECIFIED DIMENSION IN INCHES TOLERANCES DECIMALS FRACTIONS ANGLES ± .005 ± 1/64 ± 0°30' FINAL SURFACE QUALITY REMOVE BURRS AND BREAK SHARP CORNERS		DRN. DATE 6-15-69 CHK'D. DATE 6-28-69 ENG. DATE 7-29-69 PROJ. ENG. DATE 7-21-69 R.D. C. DATE 7-29-69 NEXT HIGHER ASSY A-ML-RSØ9-Ø	PARTS LIST digital EQUIPMENT CORPORATION MAYNARD MASSACHUSETTS TITLE (RSØ9) LOCATION CHART TRACK, HEAD, CABLE		
MATERIAL		SCALE NONE			
FINISH		SHEET 1 OF 1			
		D I C R S 0 9 - 0 - 7			


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SIGNAL NAME	FROM PIN	TO PIN	COLOR	REMARKS
A01J	A01J	A03E	BLUE	
A01L	A01L	A03F	"	
A01N	A01N	A04E	"	
A01R	A01R	A04F	"	
A23D	A23D	B05D	"	
A23J	A23J	B05E	"	
B03D	B03D	B22T	"	
B03E	B03E	B24E	"	
B04E	B04E	B24S	"	
+CIT	B04D	B20R	"	
+CIT	B20R	B24K	"	
B07D	A23E	B07D	"	
B07E	A23K	B07E	"	
B09J	A12H	B09J	"	
B09K	A12J	B09K	"	
B09P	A12L	B09P	"	
B09R	A12K	B09R	"	

REVISIONS				DRN.	DATE	 EQUIPMENT CORPORATION MAYNARD, MASSACHUSETTS			
REV.	DATE	CHG. NO.	APP'D.	CHK'D.	DATE				
				W. Sutherland	11-4-69	TITLE GENERAL WIRING SHEET FOR SPECIAL HAND WRAP			
				ENG. <i>Col Kim</i>	11-6-69				
				PROJ. ENG. <i>W.D. Howard</i>	11-5-69				
				PROD. <i>C.P. Jones</i>	11-7-69				
				FIRST USED ON					
				SCALE		SIZE	CODE	NUMBER	REV.
						A	WL	RS09-0-10	
				SHEET 1	OF 4	DIST.			

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manufacture or sale of items without written permission.

SIGNAL NAME	FROM PIN	TO PIN	COLOR	REMARKS
B10J	A12C	B10J	BLUE	
B10K	A12D	B10K	"	
B10P	A12F	B10P	"	
B10R	A12E	B10R	"	
B11J	A11E	B11J	"	
B11K	A11F	B11K	"	
B11P	A11D	B11P	"	
B11R	A11C	B11R	"	
B12J	A11K	B12J	"	
B12K	A11L	B12K	"	
B12P	A11J	B12P	"	
B12R	A11H	B12R	"	
B13J	A14H	B13J	"	
B13K	A14J	B13K	"	
B13P	B13P	A14L	"	
B13R	A14K	B13R	"	
B14J	A14C	B14J	"	
B14K	A14D	B14K	"	

REVISIONS				DRN.	DATE	 EQUIPMENT CORPORATION MAYNARD, MASSACHUSETTS			
REV.	DATE	CHG. NO.	APP'D.	CHK'D.	DATE				
				W. Sutherland	11-4-69	TITLE GENERAL WIRING SHEET FOR SPECIAL HAND WRAP			
				ENG. <i>Col Kim</i>	11-6-69				
				PROJ. ENG. <i>W.D. Howard</i>	11-5-69				
				PROD. <i>C.P. Jones</i>	11-7-69				
				FIRST USED ON					
				SCALE		SIZE	CODE	NUMBER	REV.
						A	WL	RS09-0-10	
				SHEET 2	OF 4	DIST.			

DEC FORM NO
104

SIGNAL NAME		FROM PIN	TO PIN	COLOR	REMARKS
B14P	A14F	B14P	BLUE		
B14R	A14E	B14R	"		
B15J	A13E	B15J	"		
B15K	A13F	B15K	"		
B15P	A13D	B15P	"		
B15R	A13C	B15R	"		
B16J	A13K	B16J	"		
B16K	A13L	B16K	"		
B16P	A13J	B16P	"		
B16R	A13H	B16R	"		
+ATT	B02D	B20S	"		
+ATT	B20S	B22F	"		
+ATT	B22F	A21D	"		
-ATT	B02E	B22J	"		
-ATT	B22J	A21K	"		
+DSL00	A06E	B13L	"		
-DSL00	A06F	B13M	"		
+DSL01	A08E	B09L	"		
-DSL01	A08F	B09M	"		

REVISIONS

REV.	DATE	CHG. NO.	APP'D.

DRN. E. STEVENSON
CHK'D. *W. H. H. H. H. H.*
ENG. *C. J. King*
PROJ. ENG. *E. S. H. H. H.*
PROD. *E. S. H. H. H.*
FIRST USED ON

DATE 10-20-9
DATE 11-4-69
DATE 11-6-69
DATE 11-5-69
DATE 11-7-69

dogman EQUIPMENT CORPORATION
MAYNARD, MASSACHUSETTS

TITLE

GENERAL WIRING SHEET

FOR

SPECIAL HAND WRAP

SIZE **A** CODE **WL**

NUMBER **RS09-0-10**

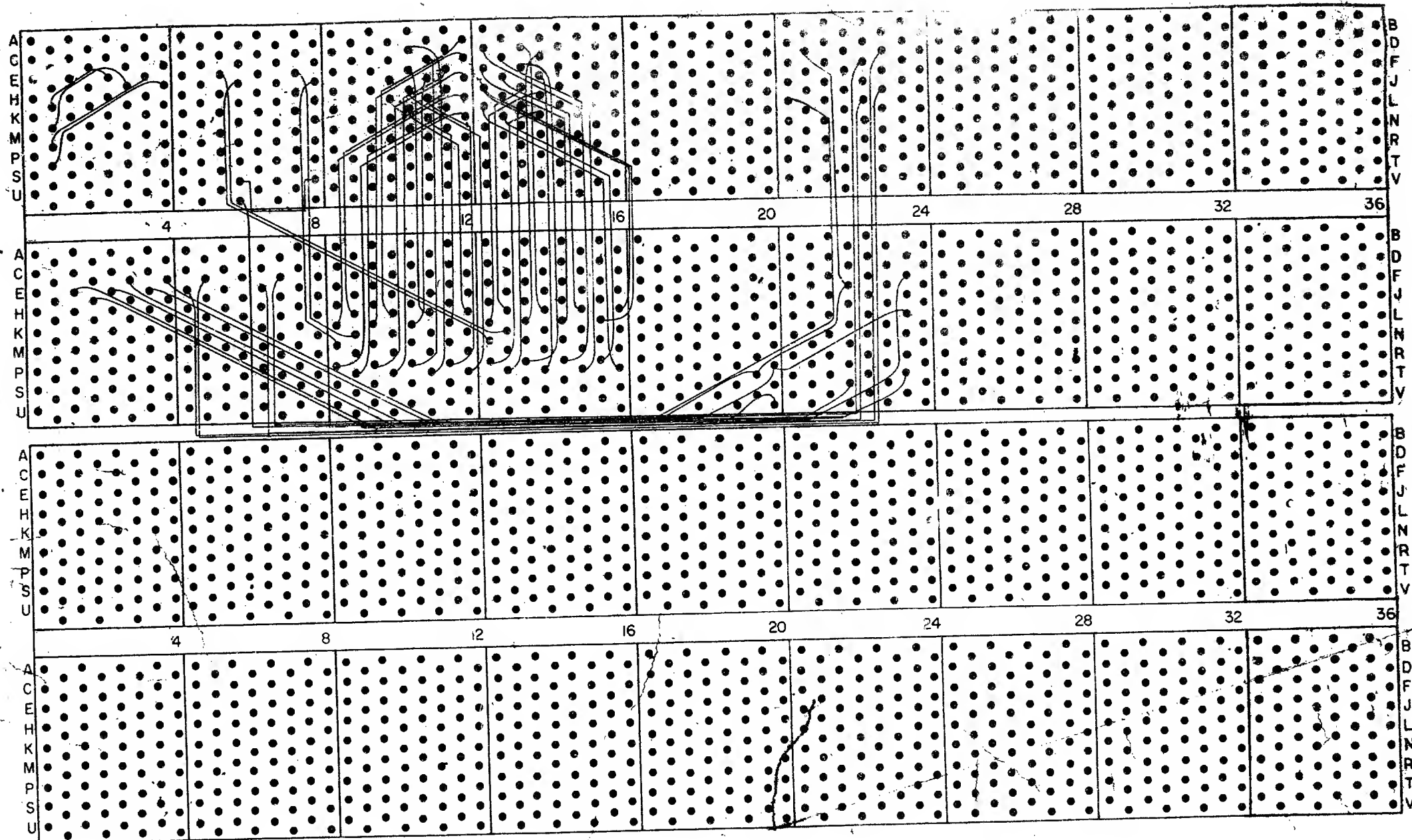
REV.

SHEET **3** OF **4**

DIST.

RECEIVED

[illegible]



DRAWN <i>John M. M...</i>		DATE 11-4-69	digital EQUIPMENT CORPORATION <small>MAYNARD, MASSACHUSETTS</small>	TITLE HAND WRAP ROUTING		
CHECKED <i>[Signature]</i>		DATE 11-4-69		FOR RS09		
DATE 11-6-69		DATE 11-5-69		DRW. NUM. C-RS09-0-11		
DATE 11-7-69		DATE 11-7-69		REV LTR. A		
REV. NO.	ECO	DATE	ENG	ASSY NO. A-ML-RS09-0	CODE WD	SHEET 1 OF 1
ORIG	RS09-0004					
A	0003	5-1-70	2811			

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DIGITAL EQUIPMENT CORPORATION
MAYNARD, MASSACHUSETTS

ENGINEERING SPECIFICATION

DATE 6/8/71

TITLE RS09 CALIBRATION PROCEDURE

REVISIONS

REV	DESCRIPTION	CHG NO	ORIG	DATE	APPD BY	DATE

1. Limit release until final version of RS09 Preliminary Calibration Program is completed.

ENG	APPD	SIZE	CODE	NUMBER	REV
W. J. WADA	Donald G. Torada	A	SP	RS09-0-12	

DEC FORM NO.
DRA 107A

SHEET 1 OF 11

CONTINUATION SHEET

TITLE RS09 CALIBRATION PROCEDURE

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DEC FORM NO
DRA 108A

SIZE	CODE	NUMBER	REV
A	SP	RS09-0-12	

SHEET 2 OF 11

TITLE RS09 CALIBRATION PROCEDURE

1.0 GENERAL INFORMATION

1.1 INTRODUCTION

This procedure is intended to supplement the information given in the RF15/RS09 DECdisk System Maintenance Manual. It is assumed that the reader is familiar with the general theory of operation and maintenance procedures for the RS09.

The primary purpose of this procedure is to specify the techniques to be used in calibrating the G085 Disk Read Amplifier and Slice Modules in the RS09. A further goal is to give the user an understanding of the reasons behind the procedures so that he can use them with confidence.

1.2 GENERAL DESCRIPTION OF CALIBRATION PROCEDURE

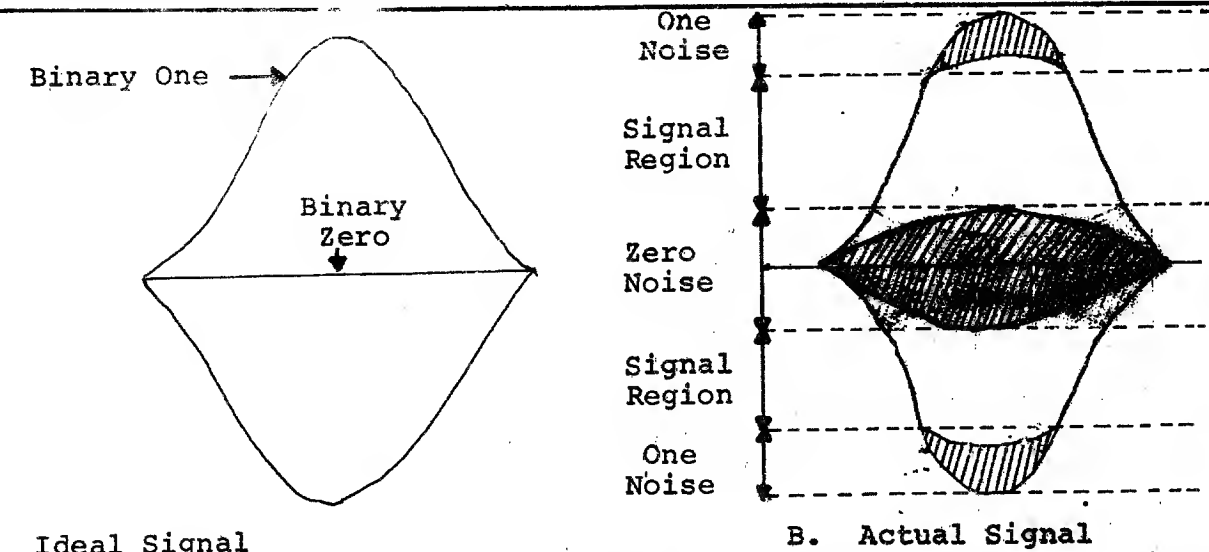
The RS09 Fixed Head Disk uses the Non-Return-to-Zero (NRZ) recording technique which means that the track magnetization is reversed everytime a binary one is recorded. No reversal occurs when recording a binary zero, i.e., nothing at all is done to the track. When reading a track, the flux reversals (binary ones) are detected by the head and appear as positive or negative pulses at the output of the sense amplifier. Binary zeros, of course, do not develop any signals. In the ideal case, data read from the disk would produce a clean signal as shown in Figure 1A. A regular data pattern such as alternating ones and zeros does, in fact, produce a signal very close to the ideal. However, experience has shown that a complex data pattern produces an extremely noisy signal as shown in Figure 1B. Since the noise depends on the data, the only reliable method of calibrating a disk is with a diagnostic that simulates a realistic data pattern.

The calibration procedure has two objectives: to maximize the good signal region and to achieve the widest possible margins against noise. The best method of reaching these goals is to use a procedure as follows (see Figure 2):

1. Check the "zero" noise level.
2. Check the "one" noise level.
3. Calculate the Figure of Merit (FM) and the signal region (Δ).
4. Put an AGC jumper on the shoe containing the track that caused the first error in Step 2.

SIZE A	CODE SP	NUMBER RS09-0-12	REV
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TITLE RS09 CALIBRATION PROCEDURE



A. Ideal Signal

B. Actual Signal

Figure 1. Sense Amplifier Output Signal - Ones & Zeros Superimposed

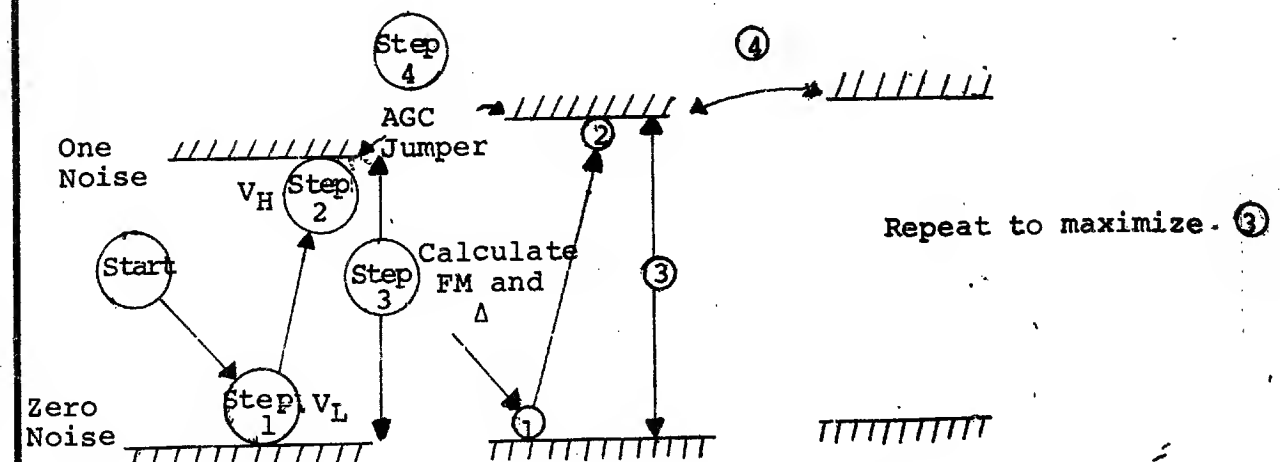


Figure 2. RS09 Setup Procedure

SIZE A	CODE SP	NUMBER RS09-0-12	REV
-----------	------------	---------------------	-----

CONTINUATION SHEET

TITLE RS09 CALIBRATION PROCEDURE

5. Repeat steps 1 to 4 until the FM and signal region are maximized.
6. Set the slice at the midpoint of the signal region.

The adjustment potentiometers on the G085 module have been modified to simplify the procedure. The gain adjustment pot has been changed so that all disk surfaces, whether high or low output, can be set to produce the same size signal out of the sense amplifier. The range of the slice adjustment pot has been increased so that it is possible to measure both the "zero" noise level and the "one" noise level without adjusting the gain pot. As a result, the gain need be set only once at the beginning of the procedure.

1.3 PRELIMINARY PREPARATIONS

Before using this calibration procedure, insure that the following steps have been taken:

1. All G085 modules have been retrofitted to Revision (f).
2. Spot check the head output signals to see if they agree with the readings on the original Head Data Sheet.
3. If the surface or any shoes have been replaced, fill out a new Head Data Sheet according to the procedures in the Maintenance Manual.
4. Have on hand a copy of the RF15 Preliminary Calibration Program (Pre CAC al Prog.) AUTOCAD-15-05AA. This program contains a switch-selectable subroutine similar to the Stamp Test in the Disk Data Diagnostic. If this program is not available, MULT-DISK and DISK DATA (STAMP TEST) can be used instead.

1.4 TROUBLESHOOTING TIPS

In order to calibrate an RS09 successfully, it is necessary to have a uniform disk surface and a set of shoes that are well matched and adjusted. In many cases, an excessive error rate may be due to a bad spot on the surface or a degraded or mis-adjusted shoe. If the disk has a high error rate that cannot be corrected by recalibrating the gain and slice adjustment, then it may be necessary to replace the surface or a shoe. To localize the problem area, take the following steps:

TITLE RS09 CALIBRATION PROCEDURE

1. Determine the troublesome tracks from the error printouts on the teletype.
2. Inspect the individual tracks using the Stamp Test.
3. If the surface modulation is too great for any track (more than 20%) or if there is a spot on the track with a low output signal, replace the surface.
4. If the surface appears to be within specification, compare the tracks within a particular shoe. If the range of head outputs within the same shoe differs by more than 25%, replace the entire shoe.

2.0 RS09 CALIBRATION PROCEDURE

2.1 GAIN AND SLICE MEASUREMENTS TECHNIQUES

To measure Gain and Slice, use the procedures outlined in Section 6.2 of the Maintenance Manual with the following exception:

Measure Slice by reading the leading edge of the composite Gain-Slice waveform.

2.2 TIMING TRACK CALIBRATION

Calibrate the A, B, and C timing tracks using the procedures in Section 6.2.3 of the Maintenance Manual with the following exceptions:

Set the average voltage (gain) to 6 volts peak-to-peak.

Set the slice to 1.4 volts (reading the leading edge).

2.3 DATA TRACK GAIN CALIBRATION

1. Find the average track in Matrix 0 from the head data sheet and record its number on the Calibration Record Sheet (Figure 3).
2. Load and run the Pre Cal ProgStamp Test Program (see paragraph 2.5.4) selecting the average track noted in Step 1.

SIZE	CODE	NUMBER	REV
A	SP	RS09-0-12	

SIZE	CODE	NUMBER	REV
A	SP	RS09-012	

ENGINEERING SPECIFICATION

CONTINUATION SHEET

TITLE RS09 CALIBRATION PROCEDURE

3. Adjust the gain of the average track to 6 volts peak-to-peak and the slice to 1.4 volts.
4. Repeat Steps 1 to 3 for Matrix 1.

NOTE:

Do not readjust gain during the rest of the calibration procedure.

2.4 DATA TRACK SLICE CALIBRATION

- 2.4.1 The Data Track Slice Calibration procedure is repetitive and has the overall objective of maximizing the signal region and the Figure of Merit for the disk. The procedure will be described for Matrix 0 through it can be performed on both matrices simultaneously to save time. Note that the low failing track found on the first pass will be considered the reference track. All subsequent slice voltage readings will be taken from this track. Since the reference track exhibits the highest "zero" noise level, do not put on AGC jumper on its shoe; to do so would increase the "zero" noise level.
- 2.4.2 To calibrate the Data Track Slice Adjustment, perform the following steps:
 1. Run the Pre. Cal. Program in the Random Pattern, Non-Save Mode.
 2. Carefully reduce the Slice voltage on Matrix 0 and find the low failing point, Increase Slice slightly until the program just runs error free. This test find the "zero" noise level illustrated above. Record the number of the first track that caused an error on the Calibration Record Sheet.
 3. Stop the Random Mode program and run one pass of the Prel. Cal. Prog. to write the pattern 252525 and restart the Stamp Test, selecting the reference track (i.e., the track found in Step 2 on the first pass.) Record the low slice voltage level (V_L). (On the first pass, also measure and record the Gain of the reference track.)

SIZE	CODE	NUMBER	REV
A	SP	RS09-0-12	

ENGINEERING SPECIFICATION

CONTINUATION SHEET

TITLE RS09 CALIBRATION PROCEDURE

4. Restart Prel. Cal. Prog. Random Non-Save Mode. Carefully increase the slice voltage and find the high failing point. Reduce slice slightly until the program just runs error free. This test finds the "one" noise level illustrated above.
5. Write 252525 PATTERN by running one pass of Prel. Cal. Prog. Go back to the Stamp Test, selecting the reference track. Record the high failing track number and the high slice voltage (V_H).
6. Install an AGC jumper on the shoe containing the high failing track found in Step 4 and record the jumper location.
7. Calculate and record the Figure of Merit (FM) and the Signal REgion (Δ), where:

$$FM = \frac{V_H - V_L}{V_H + V_L}$$

$$\text{and } \Delta = V_H - V_L$$

8. Repeat steps 1 through 7 until Δ is maximized. If Δ decreases significantly on a subsequent pass, remove the previous AGC jumper.
9. The following figures are the minimum acceptable results in calibrating the RS09. In actual practice, a disk with a good surface and well matched shoes will surpass these figures by a wide margin. Since the goal of the calibration procedure is to maximize disk performance, every effort should be made to exceed these figures.

$$\text{Minimum FM} = 0.4$$

$$\text{Minimum } \Delta = 1.3 \text{ Volts}$$

$$\text{Maximum } V_L = 1.0 \text{ Volts}$$

10. When Δ has been maximized, calculate and record the final slice voltage setting (V_F) using the data from the last pass, where:

$$V_F = \frac{V_H + V_L}{2}$$

Set the slice voltage to V_F on the reference track.

SIZE	CODE	NUMBER	REV
A	SP	RS09-0-12	

000000

CONTINUATION SHEET

TITLE RS09 CALIBRATION PROCEDURE

11. Repeat the procedure for Matrix 1.

2.5 MULTI-DISK PROGRAM OPERATING INSTRUCTIONS

2.5.1 The program used in this calibration procedure is:

AUTOCAD-15-D5AA
RF15 Calibration Program
Date:

2.5.2 Multi-Disk operates in four modes as selected by the console data switches:

Data Switch	Setting	Mode
1	0	Save Mode
	1	Non-Save Mode
3	0	Random Pattern
	1	252525 Pattern

2.5.3 To run the Random Pattern, perform the following steps:

1. Start Multi-Disk at location 200 with:

Data Switch 1 = 1
Data Switch 3 = 0

2. The operator will then be asked (via the teletype) what the last available location of memory is for the system.

Reply (in octal notation); 007777 for a 4K System
to
377777 for a 131K System

The program will then printout the number of disks on-line and start running the program.

SIZE CODE NUMBER REV
A SP RS09-0-12

digital

CONTINUATION SHEET

TITLE RS09 CALIBRATION PROCEDURE

Example:

LAST AVAILABLE MEMORY LOCATION OCTAL?17777

1 EXISTENT DISK(S)

2.5.4 To run the Stamp Test, perform the following steps:

1. Start Cal. Prog. at location 200 with:

Data Switch 1 = 1
Data Switch 3 = 1

2. Stop the computer after one pass .

3. Load the number of the desired disk in Data Switches 15 - 17. This writes a 25 pattern on the disk in non-save mode.

4. Start the Stamp Test at location 201.

5. The program will HALT at location 1235. Set the Data Switches to the 18-bit address of the desired track and press CONTINUE.

SIZE CODE NUMBER REV
A SP RS09-0-12

TITLE RS09 CALIBRATION PROCEDURE

Figure 3. RS09 CALIBRATION SHEET

RS09 SN _____ Disk Type _____ SN _____ Date _____

Use Random Pattern (Non-Save Mode) while making adjustments. Use Stamp Test (25 pattern) while taking Slice Voltage Readings.

Matrix 0

Average Track # _____

Reference Track Gain _____ volts

Reference Track # _____

Pass	Low Track #	Low Slice Voltage V_L	High Track #	High Slice Voltage V_H	FM	Δ	AGC Jumper
Final Slice Setting $V_F = \frac{V_H + V_L}{2}$							

Matrix 1

Average Track # _____

Reference Track Gain _____ volts

Reference Track # _____

Pass	Low Track #	Low Slice Voltage V_L	High Track #	High Slice Voltage V_H	FM	Δ	AGC Jumper
Final Slice Setting $V_F = \frac{V_H + V_L}{2} =$							

$$FM = \frac{V_H - V_L}{V_H + V_L}; \text{ Minimum FM} = 0.4.$$

$$\Delta = V_H - V_L; \text{ Minimum } \Delta = 1.3 \text{ volts}$$
$$\text{Maximum } V_L = 1.0 \text{ volts}$$

SIZE
ACODE
SPNUMBER
RS09-0-12

REV

MASTER DRAWING LIST

[illegible]

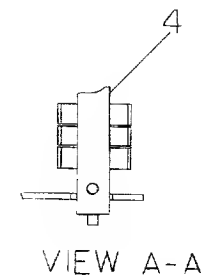
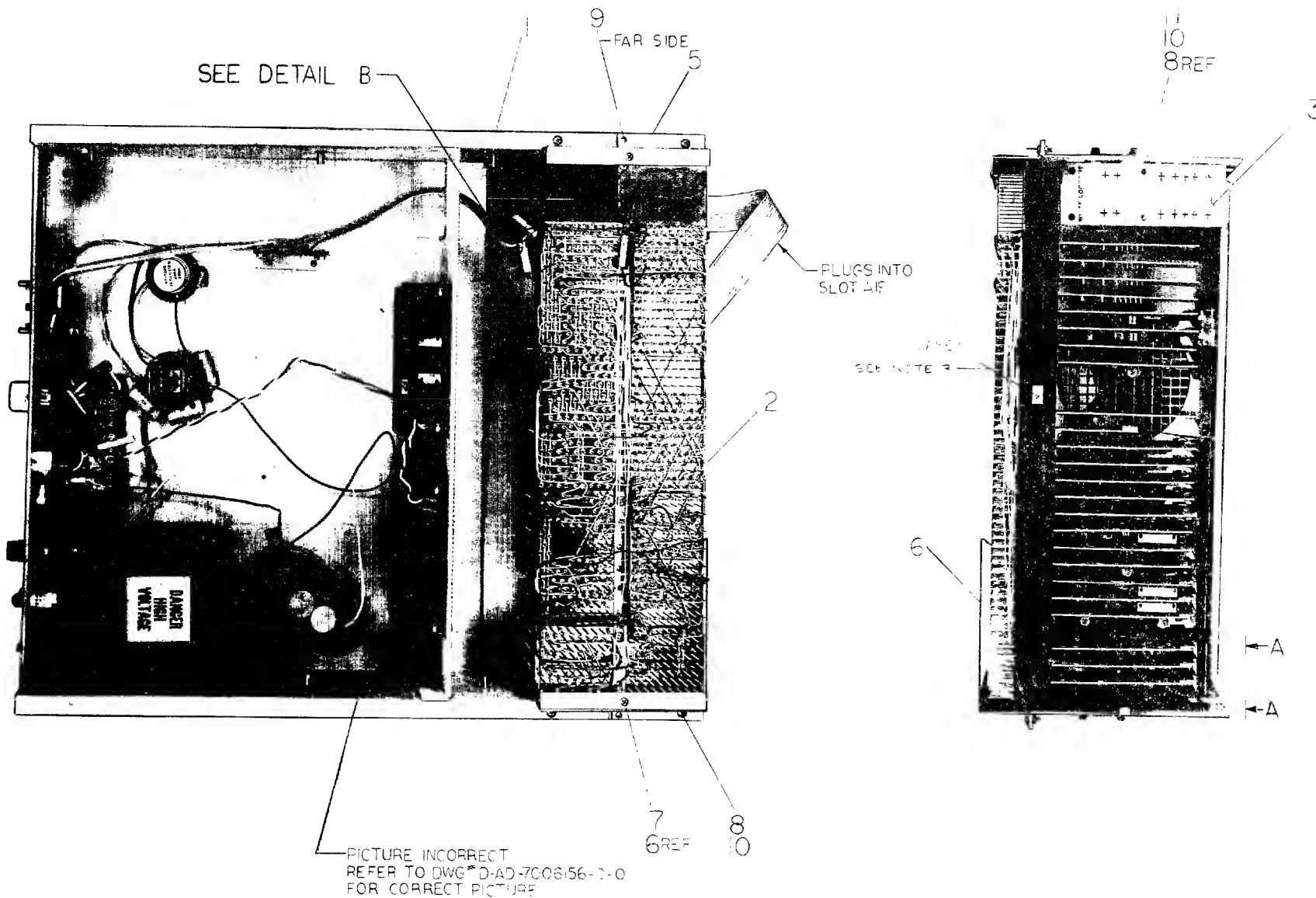
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8 7 6 5 4 3 2 1
DUA RS09-P-0 3000 12715

NOTES:

1. FOR DWG INDEX LIST REFER TO C-DI-RS09-P-
2. WIRES TO BE SOLDERED TO LOCATIONS SHOWN PER DETAIL B
3. LABEL (PURCHASE SPEC #1809816), TO BE APPLIED AS REQUIRED AT FINAL ASSEMBLY

DETAIL B
(YEL) TO PIN A10A
(BLK) TO GND 8 (LOCATED ON #29 OF 144 PIN BLOCK)
(BLU) TO PIN B24B
(RED) TO PIN B24A
SEE NOTE 2



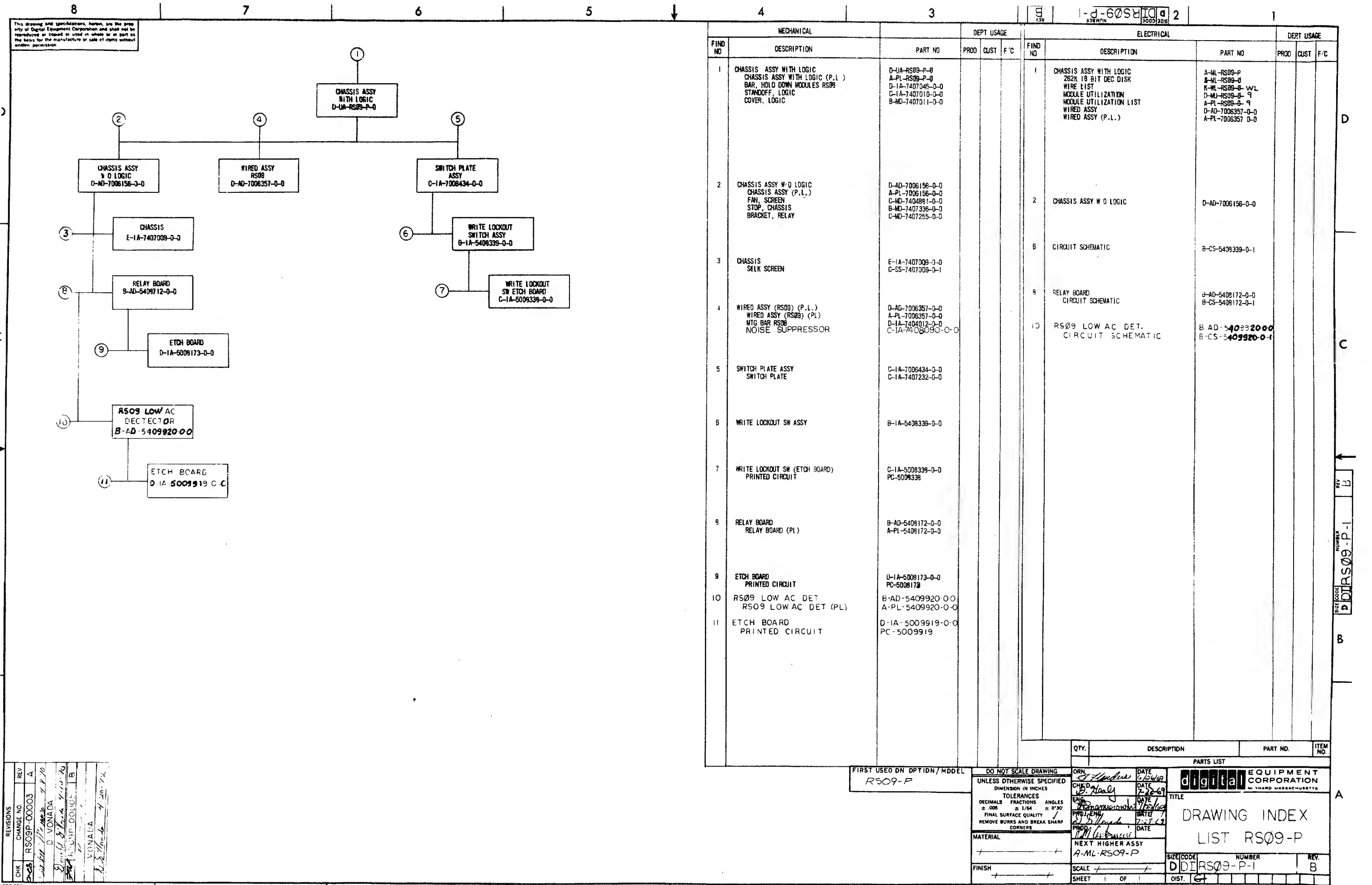
PICTURE INCORRECT
REFER TO DWG D-AD-7C06156-1-0
FOR CORRECT PICTURE

REV.	CHANGE NO.	DATE
A	1	1-22-70
B	2	1-22-70
C	3	1-22-70
D	4	1-22-70

FIRST USED ON OPTION/MODEL RS09-0		QTY.	DESCRIPTION	PART NO.	ITEM NO.
UNLESS OTHERWISE SPECIFIED		PARTS LIST			
UNLESS OTHERWISE SPECIFIED		digital EQUIPMENT CORPORATION MAYNARD, MASSACHUSETTS			
DIMENSION IN INCHES		TITLE CHASSIS ASS'Y WITH LOGIC (RS09-P)			
TOLERANCES		SIZE/CODE			
DECIMALS FRACTIONS ANGLES		NUMBER			
±.005 ± 1/64 ± 0°30'		REV.			
FINAL SURFACE QUALITY		DUA RS09-P-0			
REMOVE BURRS AND BREAK SHARP CORNERS		OIST. 5			
MATERIAL		SCALE NONE			
FINISH		SHEET 1 OF 1			

[illegible]

DEC FORM NO.
DRA 110



REVISIONS		CHG	NO	REV
1	2	3	4	5
1	2	3	4	5
1	2	3	4	5
1	2	3	4	5
1	2	3	4	5
1	2	3	4	5
1	2	3	4	5
1	2	3	4	5
1	2	3	4	5


DEC FORM NO 100

FIRST USED ON DPT/IDN/MODEL RS09-P		DO NOT SCALE DRAWING UNLESS OTHERWISE SPECIFIED DIMENSION IN INCHES TOLERANCES DECIMALS FRACTIONS ANGLES ± .005 ± 1/64 ± 0°30' FINAL SURFACE QUALITY REMOVE BURRS AND BREAK SHARP CORNERS		ORIN DATE 7-28-69 CHKD DATE 7-28-69 ENG DATE 7-28-69 PROJ ENG DATE 7-28-69 PROD DATE 7-28-69	DATE 7-28-69 DATE 7-28-69 DATE 7-28-69 DATE 7-28-69	TITLE DRAWING INDEX LIST RS09-P	SIZE CODE D	NUMBER RS09-P-1	REV. B	
MATERIAL +-----+		NEXT HIGHER ASSY A-ML-RS09-P		SCALE +-----+		SHEET 1 OF 1		DISTR.		

REV B
NUMBER
P D I R S 0 9 - P - 1

DRWG NO		REV LTR	
K-WL-RS09-0-WL		C	

REVISIONS			
REV LTR	ECO NO	DATE	ENG
A	RS09-00004	11-3-67	WJ
B	00009	1-16-70	RSJ
C	RS09-00013	5-11-70	RSJ

FIRST USED ON OPTION/MODEL		DRAWN		DATE		 EQUIPMENT CORPORATION MAYNARD, MASSACHUSETTS		TITLE			
RS09		CHECKED		DATE							
		ENG		DATE				FOR TAPE # FILE #			
		PROD. ENG.		DATE							
		PROD		DATE							
		ASSY NO		SIZE		CODE		DWG. NO.		REV LTR	
		A-ML-RS09-0		K		WL		RS09-0-WL		C	
		SCALE		SHEET		OF		DIST.			

8
7
6
5
4
3
2
1

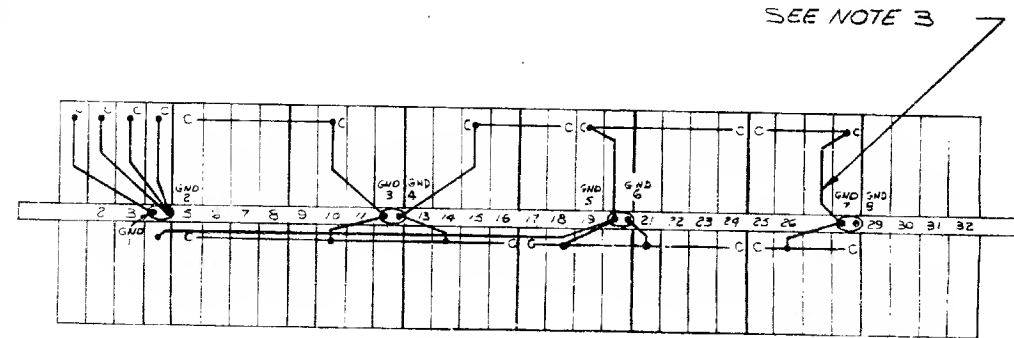
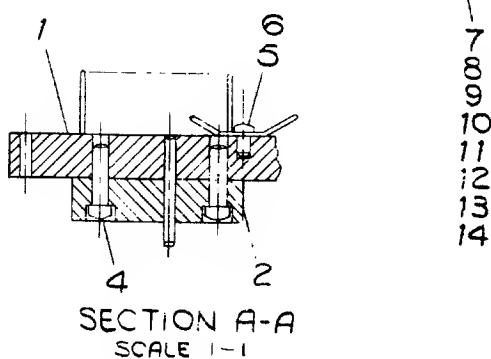
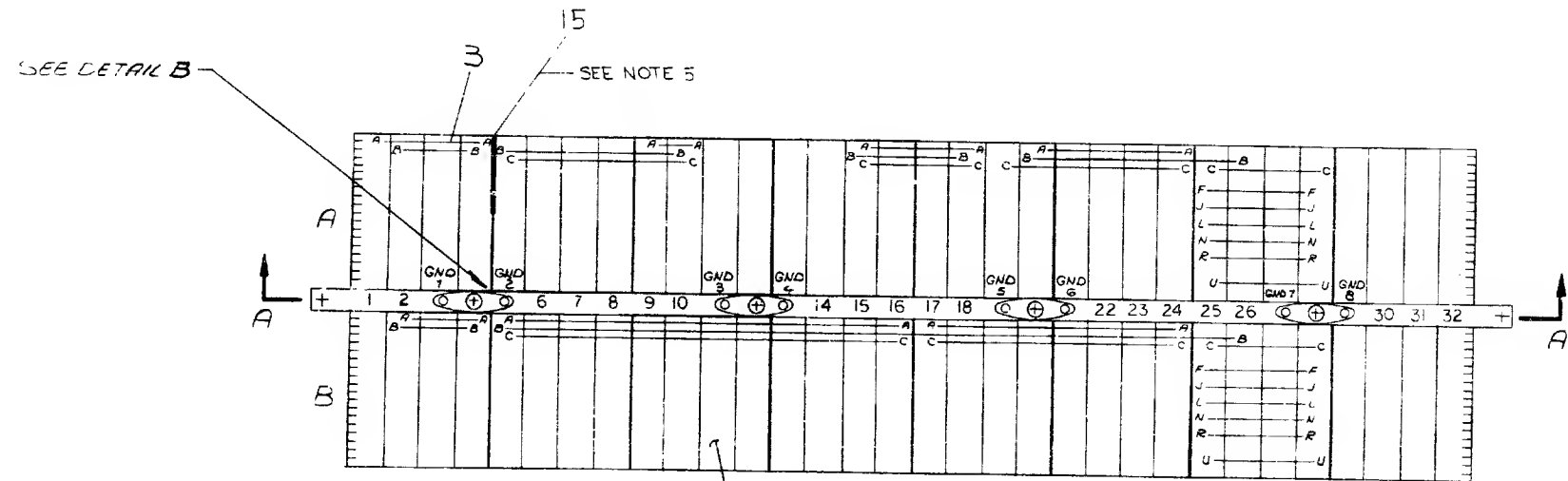
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EXTERNAL COMPONENT TABLE					
ITEM	COMP	POL	FROM	TO	REMARKS
11, 12	CAP	-	B23B	B26C	SEE NOTE # 4
11, 12	CAP	-	B24B	B27C	

WIRE TABLE					
SIGNAL NAME	ITEM NO	AWG	COLOR	FROM	TO
+10	7	#18	RED	A24A	B24A
+10	7		RED	A20A	A08A
+10	7		RED	A08A	A06A
+20	8		ORN	B04A	A04A
	8		ORN	A04A	A10A
	8		ORN	A10A	A15A
+20	8		ORN	A10A	B09A
-15	9		BLU	A24B	B24B
			BLU	B24B	B04B
			BLU	B04B	A04B
			BLU	A10B	A15B
-15	9		BLU	A18B	A20B
GND	10		BLK	GND 7	A28C
GND	10		BLK	GND 7	B26C
GND	10	#18	BLK	GND 6	B21C

WIRE TABLE					
SIGNAL NAME	ITEM NO	AWG	COLOR	FROM	TO
GND	10	#18	BLK	GND 5	A19C
				GND 5	B18C
				GND 5	B04C
				GND 4	B14C
				GND 4	A15C
				GND 3	B10C
				GND 3	A10C
				GND 2	A04C
				GND 2	A03C
				GND 2	A02C
GND	10	#18	BLK	GND 1	A01C

- NOTES:
1. ALL CONN. BLOCKS TO BE GROUNDED TO GND LUGS AS PER CHART & DET. B
 2. USE YEL WIRE (ITEM #13) FOR MACHINE WRAPPED, BLU WIRE (ITEM #14) FOR HAND WRAPPED WIRING.
 3. GND WIRES TO BE #18 AWG STRANDED BLK INS.
 4. DRESS CAPS IN MTG BAR CHANNEL.
 5. ADD VOISE SUPPRESSOR BETWEEN A04 & A05 MODULE BLOCKS. TIE GND WIRE TO A05C



DETAIL B
GROUND CONNECTIONS

REV	CHG	BY	DATE
1	1	RS09-00000	5-10-69
2	1	RS09-00000	5-10-69
3	1	RS09-00000	5-10-69
4	1	RS09-00000	5-10-69
5	1	RS09-00000	5-10-69
6	1	RS09-00000	5-10-69
7	1	RS09-00000	5-10-69
8	1	RS09-00000	5-10-69
9	1	RS09-00000	5-10-69
10	1	RS09-00000	5-10-69
11	1	RS09-00000	5-10-69
12	1	RS09-00000	5-10-69
13	1	RS09-00000	5-10-69
14	1	RS09-00000	5-10-69
15	1	RS09-00000	5-10-69
16	1	RS09-00000	5-10-69
17	1	RS09-00000	5-10-69
18	1	RS09-00000	5-10-69
19	1	RS09-00000	5-10-69
20	1	RS09-00000	5-10-69
21	1	RS09-00000	5-10-69
22	1	RS09-00000	5-10-69
23	1	RS09-00000	5-10-69
24	1	RS09-00000	5-10-69
25	1	RS09-00000	5-10-69
26	1	RS09-00000	5-10-69
27	1	RS09-00000	5-10-69
28	1	RS09-00000	5-10-69
29	1	RS09-00000	5-10-69
30	1	RS09-00000	5-10-69
31	1	RS09-00000	5-10-69
32	1	RS09-00000	5-10-69

FIRST USED ON OPTION/MODEL RS09-0	QTY	DESCRIPTION	PART NO.	ITEM NO
UNLESS OTHERWISE SPECIFIED DIMENSION IN INCHES TOLERANCES DECIMALS FRACTIONS ANGLES ± .005 ± 1/64 ± 0°30' FINAL SURFACE QUALITY REMOVE BURRS AND BREAK SHARP CORNERS	DRN 5-12-69 CHKD 5-19-69 ENG 5-10-69 PROJEN 5-10-69 PROD 5-10-69	DATE 5-12-69 DATE 5-19-69 DATE 5-10-69 DATE 5-10-69 DATE 5-10-69	PARTS LIST digital EQUIPMENT CORPORATION NATURAL MASSACHUSETTS	TITLE WIRED ASSY RS09
MATERIAL FINISH	SCALE SHEET 1 OF 1	NUMBER D1AD7006357-0-0	REV B	

[illegible]

DEC 10 1964